REMARKS

In view of the remarks to follow, Claims 1-16 are pending in the Application.

REJECTIONS UNDER 35 USC 112, first paragraph

Claims 1-16 stand rejected under 35 USC 103(a), as being unpatentable over Shimizu. The rejection should be withdrawn in view of the remarks below.

Applicants' invention is related to a polishing slurry comprising:

(a) from about 2.5 to about 70% by volume of a silica sol that contains about 30% by weight of SiO_2 particles and is stabilized by H^+ or K^+ ions, the SiO_2 particles having a mean particle size of less than 300 nm, and

(b) from about 6 to about 10% by volume of hydrogen peroxide and a base in a quantity that is sufficient to set the pH of the polishing slurry at a pH ranging from about 5 to about 11.5.

The Office Action states:

> As pertaining to claims 1, 8, and 11, Shimizu teaches a process for producing silica comprising: treating an acidic silicate sol composition with hydrogen peroxide, adjusting the pH of the sol to 0 to 5 by adding a base selected from the group consisting of sodium hydroxide and potassium hydroxide (claim 1), which reads on,
>
> A polishing slurry comprising:
>
> (a) a silica sol that contains SiO_2 particles, and
> (b) hydrogen peroxide and a base in an amount that is sufficient to set the pH of the polishing slurry at a pH that falls within the range of 5 to 11.5.
>
> Shimizu differs in failing to specify from 2.5 to about 70% by volume of silica sol that contains from 15 to 40% by weight SiO_2 particles having a mean particle size of less than 300 nm, 6 to 10% by volume of hydrogen peroxide and the slurry at a 22°C, **in claim 1;**

the percent by weight of SiO_2 in silica sol, **in claims 2-5**;
the percent by weight of SiO_2 in the slurry, as specified **in claim 6**;
the percent by volume of hydrogen peroxide in the slurry, **in claim 7**;
a pH ranging from 6 to about 10, **in claim 9** of the polishing slurry; and
the removal rate of more than 300 A/min, a Cu:Ta selectivity of more than 1:2, a Cu:dielectric selectivity of more than 1:1 or greater, **in claim 10**.

Shimizu further differs in failing to specify from about 2.5 to about 70% by volume of silica sol containing SiO_2 particles, from about 6 to 10% by volume of hydrogen peroxide and the slurry at a 22°C, a Ta removal rate of more than 300 A/min, a Cu:Ta selectivity of more than 1:2, a Cu:dielectric selectivity of more than 1:1 or greater, and the Ta removal rate is ≥ 1.5 times the removal rate of a dielectric that can be polished by the slurry, **in claim 11**;
the mean particle size of less than about 300 nm and the percent by weight of SiO_2 in the silica sol, **as recited in claim 12**;
the percent by weight of SiO_2 in, **in claims 13-15**; and
the percent by weight of SiO_2 in the slurry, **as recited in claim 16**.

It would have been obvious to one having ordinary skill in the art at the time of the claimed invention to use any combination of parameters such as the removal rate, polish selectivity, pH, temperature, percent by weight and percent by volume of the components of the slurry as taught in the Shimizu's reference and including those presented in applicants' claim for the purpose of producing a high purity sol (Shimizu, column 3, lines 33-40). (Office Action, page 2, para. 3, through page 4, para. 1).

Shimuza teaches a process for producing high purity silica for applications of raw material in optical fibers of a sealing material in the production of microprocessor devices in particular large scale integrated circuits.

Shimuza teaches that elements in the silica, especially of alpha-emitters like U or of other heavy metals which disturb the application of the silica, are not present.

Shimuza does teach or suggest silica material in the form of polishing slurries for polishing applications in the semiconductor production.

Rather Shimuza teaches to use hydrogen peroxide in a quantity of from 0.05 % by weight to 1 % by weight for the purification of silica in order to remove elements like U, Fe, Tl, Al etc. by complexing and removing them via ion exchange.

In fact Shimuza teaches away from applying an amount greater than 1 % by weight and that such an amount is unsuitable because of the insufficient purification of the silica (Shimuza, col. 3, lines 22 - 31).

Applicants' invention is novel because after purification with hydrogen peroxide the separated silica will be removed from the purified solution.

Therefore the hydrogen peroxide containing silica sol is only an intermediate step in a process which leads to a different product than that of our present main claim and described in the specification.

Applicants' Invention includes the polishing slurry having silica comprising 6 to about 10 % by volume of hydrogen peroxide, and thus is far more than the disclosed maximum percentage of 1 % of the purification solution according to Shimuza.

Thus, one skilled in the art would not be motivated to modify Shimuza. Accordingly, Shimuza does not obviate Applicants' invention.

In view of the above amendments, Applicants submit that the claims are in condition for allowance and the Examiner would be justified in allowing them.

Respectfully submitted,

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